

CLAIMS

1. A dielectric barrier discharge lamp comprising

5 a discharge vessel, the discharge vessel enclosing with a wall of the discharge vessel a discharge volume filled with discharge gas, and having a phosphor layer within the discharge volume,

a first set of interconnected electrodes and a second set of interconnected electrodes, the electrodes being isolated from the discharge volume by at least one dielectric layer, at least one of the dielectric layers being constituted by the wall of the discharge vessel,

10 both the first and second set of electrodes being located external to the discharge vessel.

2. The lamp of claim 1, in which the discharge vessel comprises

an outer tubular portion having an internal surface,

15 an inner tubular portion having an outward surface, the outer tubular portion surrounding the inner tubular portion, the discharge volume being enclosed between the internal surface of the outer tubular portion and the outward surface of the inner tubular portion.

20 3. The lamp of claim 2, in which the electrodes are located at an internal surface of the inner tubular portion.

4. The lamp of claim 3, in which the first and second set of electrodes are formed as elongated conductors extending along a principal axis of the inner tubular portion.

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5. The lamp of claim 4, in which the elongated conductors associated to the first and second set of electrodes are distributed along the internal surface of the inner tubular portion uniformly and alternating with each other.

30 6. The lamp of claim 4, in which the elongated conductors are metal stripes or metal bands.

7. The lamp of claim 2, in which the phosphor layer covers any of the outward surface of the inner tubular portion or the internal surface of the outer tubular portion.

5 8. The lamp of claim 2, in which the outward surface of the inner tubular portion comprises a reflective layer reflecting in any of the UV or visible wavelength ranges.

9. The lamp of claim 2, in which an electrode support is inserted within the inner tubular portion, and the electrodes are mechanically supported by the electrode support.

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10. The lamp of claim 9, in which the electrode support is a tubular body made of an electrically insulating material and inserted into the inner tubular portion.

11. The lamp of claim 9, in which the electrode support is a plate made of an electrically
15 insulating flexible material, which is rolled into a tubular form and inserted into the inner tubular portion.

12. The lamp of claim 2, in which the inner tubular portion comprises spring means for pressing the electrodes to the internal surface of the inner tubular portion.

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13. The lamp of claim 12, in which the spring means are mechanically supported by an electrode support.

14. The lamp of claim 13, in which the electrode support is a tubular body comprising
25 elongated grooves parallel to a principal axis of the tubular body, and the spring means are embedded in the grooves.

15. The lamp of claim 12, in which an electrically insulating spacer is inserted between the spring means and the electrode associated to the respective spring means.

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16. The lamp of claim 12, in which the spring means are mechanically supported by a spring support, and the electrodes are mechanically supported by an electrode support surrounding the spring support.

5 17. The lamp of claim 1, in which the discharge vessel is made of glass.

18. The lamp of claim 2, in which the wall thickness of the inner tubular portion is approx. 0.5 mm.

10 19. The lamp of claim 2, in which the distance between the internal surface of the outer tubular portion and the outward surface of the inner tubular portion is 3-11 mm.

20. The lamp of claim 2, in which the inner tubular portion comprises an exhaust tube communicating with the discharge volume.

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21. The lamp of claim 20, in which one end of the outer tubular portion is closed, and the exhaust tube extends along a central principal axis of the inner tubular portion, so that a free end of the exhaust tube is opposite to the closed end of the outer tubular portion.

20 22. A dielectric barrier discharge lamp apparatus comprising
a discharge vessel, the discharge vessel enclosing with a wall of the discharge
vessel a discharge volume filled with discharge gas, and having a phosphor layer within the
discharge volume,
a first set of interconnected electrodes and a second set of interconnected electrodes,
25 the electrodes being isolated from the discharge volume by at least one dielectric layer, at
least one of the dielectric layers being constituted by the wall of the discharge vessel,
an AC power source connected to the first and second set of interconnected
electrodes,
both the first and second set of electrodes being located external to the discharge
30 vessel.

23. The apparatus of claim 22, in which the AC power source delivers a voltage of 1-5 kV on an AC frequency of 50-200 kHz.

5 24. A discharge vessel for a dielectric barrier discharge lamp, the discharge vessel enclosing a sealed discharge volume filled with discharge gas, and comprising
an outer tubular portion having an internal surface,
an inner tubular portion having an outward surface,
the outer tubular portion surrounding the inner tubular portion, the sealed discharge
10 volume being enclosed between the internal surface of the outer tubular portion and the outward surface of the inner tubular portion.

25. The discharge vessel of claim 24, in which the outer tubular portion and the inner tubular portion are substantially concentric with each other.

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26. The discharge vessel of claim 24, in which the distance between the internal surface of the outer tubular portion and the outward surface of the inner tubular portion is 3-11 mm.

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27. The discharge vessel of claim 24, in which the discharge vessel has a phosphor layer within the sealed discharge volume.

28. The discharge vessel of claim 24, in which the inner tubular portion comprises an exhaust tube communicating with the discharge volume.

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29. The discharge vessel of claim 28, in which one end of the outer tubular portion is closed, and the exhaust tube extends along a central principal axis of the inner tubular portion, so that a free end of the exhaust tube is opposite to the closed end of the outer tubular portion.

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30. A dielectric barrier discharge lamp comprising

a discharge vessel, the discharge vessel enclosing with a wall of the discharge vessel a discharge volume filled with discharge gas, and having a phosphor layer within the discharge volume, the discharge vessel comprising

an outer tubular portion having an internal surface,

5 an inner tubular portion having an outward surface, the outer tubular portion surrounding the inner tubular portion, the discharge volume being enclosed between the internal surface of the outer tubular portion and the outward surface of the inner tubular portion,

the discharge lamp further comprising

10 a first and a second set of interconnected electrodes located external to the discharge vessel, the electrodes being isolated from the discharge volume by at least one dielectric layer, at least one of the dielectric layers being constituted by the wall of the discharge vessel.

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